## GORDEEV et al. S.N. 09/424,760

where X = specified size of desired nanopores and  $X \le 10 \, \text{nm}$ ;

Z = 0.65-0.75 nm;

 $R = vM_c\rho_k/M_k\rho_C$ 

where

 $M_c$  - molecular mass of carbon, g/mole;

 $M_k$  - molecular mass of the selected carbide, g/mole;

 $\rho_k$  - density of the selected carbide, g/ccm;

 $\rho_c$  - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule;

forming an intermediate body with transport pores having a size larger than 100 nm by shaping the selected powders;

heat treating the intermediate body in a medium of gaseous hydrocarbon or hydrocarbon mixtures at a temperature exceeding the decomposition temperature for the hydrocarbon or hydrocarbons until the mass of the intermediate body has increased at least 3% thereby producing a work piece in the form of a rigid carbonaceous skeleton; and

thereafter thermochemically treating the work piece in a medium of a gaseous halogen to produce the porous carbon article having nanopores of a size X.

Amend claim 27 as follows:

-27. (amended) A method for producing a porous carbon article comprising the steps of:



## GORDEEV et al. S.N. 09/424,760

selecting powders of at least one carbide of an element selected from the group consisting of Group III, IV, V and VI of Mendeleyv's Periodic System, the at least one carbide having physical and chemical constants to obtain a porous carbon article having a desired nanoporosity by calculating using the relationship:

$$X = Z*(1-R)/R$$

where X = specified size of desired nanopores and  $X<10\,\mathrm{nm}$ ,  $\mathrm{nm}$ ;

$$Z = 0.65-0.75 \text{ nm};$$

$$R = vM_c\rho_k/M_k\rho_c$$

where



 $M_c$  - molecular mass of carbon, g/mole;

 $M_k$  - molecular mass of the selected carbide, g/mole;

 $\rho_k$  - density of the selected carbide, g/ccm;

 $\rho_{c}$  - density of carbon, g/ccm;

ν - number of carbon atoms in carbide molecule;

forming an intermediate body with transport pores having a size larger than 100 nm by shaping the selected powders;

heat treating the intermediate body in a medium of gaseous hydrocarbon or hydrocarbon mixtures at a temperature exceeding the decomposition temperature for the hydrocarbon or hydrocarbons until the mass of the intermediate body has increased at least 3% thereby producing a work piece in the form of a rigid carbonaceous skeleton; and

## GORDEEV et al. S.N. 09/424,760

thereafter thermochemically treating the work piece in a medium of a gaseous halogen to produce the porous carbon article having nanopores of a size X, and

wherein the intermediate body has a porosity determined with the following relationship:

$$\varepsilon_0 = (1 - v_{np}/\Sigma K_i \phi_i) * 100$$

 $\epsilon_0$  porosity of intermediate body vol%;

where

 $\phi_{\rm i}$  - volumetric part of i-th carbide in particle mixture;

 $\nu_{np} \mbox{ - predetermined volumetric part of nanopores in} \label{eq:np}$  final article;

$$K_i = 1 - \nu M_c \rho_{ki} / M_{ki} \rho_c$$

where  $M_c$  - molecular mass of carbon, g/mole;

 $M_{ki}$  - molecular mass of i-th carbide, g/mole;

 $\rho_{ki}$  - density of i-th carbide, g/ccm;

 $\rho_c$  - density of cabon, g/ccm;

 $\nu$  - number of carbon atoms in carbide molecule.